

column, on page 309. We do not use pit gages in ordinary work; they have only been used in several cases at stations at which experiments were in progress as to the decrease in the amount collected at different altitudes, but they have never been used at ordinary rainfall stations. Our standard gages have their orifices 1 foot above the natural level of the soil; there is no pit and no protection. An engraving illustrating this matter is given in the "Instructions to Observers," at the end of nearly every annual volume of British Rainfall. We adopted 1 foot chiefly to avoid in-splashing from surrounding soil. Every one did not surround his gage with grass, and we found garden mould in the bottles.

I heartily endorse the Editor's remarks as to the evil of moving old-established gages. Observers little know the harm that they may thus do.

I would plead for the establishment, in the United States, of more gages at, or near, the ground level. In Great Britain the rainfall records are largely used by engineers, they want to know what reaches the ground, not what can be caught on a roof 100 feet above it. Cannot the Weather Bureau secure such records in parks within cities and at agricultural stations. Will not the MONTHLY WEATHER REVIEW and the annual reports indicate which records belong to gages on the roofs and which to those on the ground, as this distinction is one of great importance?

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Manuel E. Pastrana, Director of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the Boletín Mensual. An abstract, translated into English measures, is here given, in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for October, 1899.

Stations.	Altitude.	Mean barometer.	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
Cullacán Rosales (E. d. S.)	113	29.69	97.7	63.5	81.9	57	0.69	ne.	ne.
Durango (Seminario)	6,243	24.05	87.5	43.2	64.2	59	2.12	sw.	e.
Leon (Guanajuato)	5,934	24.81	84.2	37.3	64.4	62	1.18	se.	se.
Mexico (Obs. Cent.)	7,472	23.08	78.1	37.0	59.9	64	0.81	ne.	ne.
Morelia (Seminario)	6,401	23.98	79.3	43.7	56.7	77	1.88	w.	w.
Puebla (Col. Cat.)	7,113	23.88	78.4	39.7	63.1	84	2.39	ene.	nw.
Saltillo (Col. S. Juan)	5,399	26.39	78.1	44.6	65.5	80	5.79	s.	sw.
San Isidro (Hac. de Guanajuato)	6,063	24.28	83.8	59.9	71.9	62	2.61	ese.	w.
Silao	6,063	24.28	77.9	47.3	66.7	62	1.44	ese.	w.

OBSERVATIONS AT HONOLULU.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, the monthly report of meteorological conditions at Honolulu is now made partly in accordance with the new form, No. 1040, and the arrangement of the columns, therefore, differs from those previously published.

Meteorological observations at Honolulu, October, 1899.

The station is at 31° 18' N., 157° 50' W.
Pressure is corrected for temperature and reduced to sea level, and the gravity correction, -0.06, has been applied.
The average direction and force of the wind and the average cloudiness for the

whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours has always been measured at 7:30 p. m., not 1 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p.m. Greenwich time, or 2:30 a. m., Honolulu time.								Total rainfall at 9 a. m. local time.	
				Temperature.		Means.	Wind.		Average cloudiness.	Sea-level pressures.			
		Dry bulb.	Wet bulb.	Maximum.	Minimum.		Dew-point.	Relative humidity.		Prevailing direction.	Force.		Maximum.	Minimum.
1.....	29.96	73	69.5	88	70	65.7	72	ne.	3	4	30.04	29.95	0.08
2.....	29.96	75	69	84	73	67.7	72	ne.	1-3	6	30.02	29.93	0.00
3.....	29.98	74	71	85	75	66.7	67	ene.	3	4	30.05	29.95	0.08
4.....	30.02	75	68.5	83	73	68.0	72	ne.	4	9	30.08	29.98	0.01
5.....	30.05	76	68	84	75	65.0	64	ne.	4	4	30.08	29.99	0.00
6.....	30.04	74	67	84	73	68.5	62	ne.	3	1	30.09	30.00	0.00
7.....	29.98	71	67	83	74	64.0	64	ene.	3	5	30.06	29.95	0.00
8.....	29.91	70	67	84	73	65.5	68	ne-sw.	1	3-8	29.97	29.89	0.00
9.....	29.91	70	65	82	68	67.0	68	s.	1	4-8-0	29.95	29.87	0.00
10.....	29.92	73	67	85	64	68.5	64	e.	1-3	1	29.95	29.88	0.00
11.....	29.98	71	66.5	83	70	62.5	63	e-n.	1	7-2	29.95	29.85	0.00
12.....	29.95	73	69.5	83	71	65.3	70	se.	2	4-10	29.93	29.83	0.12
13.....	29.97	74	72	77	71	70.0	66	e-s.	3	10	29.94	29.81	0.08
14.....	29.94	71	69.5	83	74	70.3	62	s.	2	10-3	29.96	29.89	0.00
15.....	29.93	75	69	85	71	68.0	63	e-ne.	3-0	5	29.99	29.90	0.00
16.....	29.96	75	66.5	84	75	65.7	66	e-ne.	1-3	3	30.00	29.91	0.00
17.....	30.00	75	66.5	83	74	68.7	61	ne.	3-6	4	30.03	29.94	0.04
18.....	30.00	73	67.5	82	71	68.7	61	ne.	5-6	4	30.07	29.97	0.40
19.....	29.91	70	67.5	79	70	65.5	72	ene.	4-2	8	30.03	29.91	0.70
20.....	29.87	71	68.5	79	69	65.0	74	nne.	2	8	29.97	29.87	0.38
21.....	29.87	72	70	77	70	68.0	82	nne.	2-4	8	29.93	29.85	1.40
22.....	29.98	74	68.5	77	70	69.0	85	ne.	6-2	5	29.97	29.87	0.19
23.....	29.95	74	68	80	71	65.7	70	ne.	4	4	30.00	29.91	0.01
24.....	29.97	74	68.5	81	73	65.0	67	ne.	4	4-8	30.03	29.93	0.00
25.....	29.95	74	69	79	71	62.5	64	ne.	2	5	30.02	29.95	0.10
26.....	30.02	75	67	78	72	67.0	75	ne.	6-2	8	30.04	29.94	0.08
27.....	30.06	74	66	80	73	64.0	65	ne	6-2	8	30.10	30.00	0.07
28.....	30.04	72	65.5	80	72	61.7	63	ene.	5	8	30.11	30.03	0.05
29.....	30.01	72	65.5	78	69	62.0	65	ene.	4	6-3	30.08	29.98	0.00
30.....	29.99	69	67	80	72	63.5	65	ne.	3	3	30.04	29.94	0.02
31.....	30.00	69	65.5	78	68	65.0	78	ne-n.	1-0	8	30.05	29.95	0.28
Sums.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4.04
Means.....	29.96	72.9	67.5	81.4	71.5	65.5	70.7	.....	2.9	6.5	30.02	29.92	....
Departure.....	+0.05	.....	.....	.....	.....	-0.7	-1.0	.....	.....	+1.2	.....	.....	+1.56

Mean temperature for October, 1899 (6+2+9), +3=75.7°; normal is 76.8°. Mean pressure for October (9+3)+2=29.97; normal is 29.966.

*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4:30 p. m., Greenwich time. ‡These values are the means of (6+9+2+9)+4. §Beaufort scale.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined list of titles has been selected from the contents of the periodicals and serials recently arrived in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

Das Wetter. Berlin. 16 Jahrgang.

Bebber, von, W. J. Wissenschaftliche Grundlage einer Wettervorhersage auf mehrere Tage voraus, insbesondere im Interesse der Landwirthschaft. P. 217.

Meinardus, W. Ueber die Nothwendigkeit hydrographischer Studien im nordatlantischen Ocean zum Verständniss der meteorologischen Erscheinungen im nordalpinen Europa. P. 222.

Davis, W. M. Die Cirkulation der Atmosphäre. (Fortsetzung.) P. 228.

Weise, — Wolkenbildung, Regen und Wald. (Schluss.) P. 233. *Philosophical Magazine. London. Vol. 48.*

Chattock, A. P. Velocity and Mass of the Ions in the Electric Wind in the Air. P. 401.

Bulletin American Geographical Society. New York. Vol. 31.

Ward, R. De C. Acclimatization of the White Man in the Tropics. P. 367.

- Electrical World and Engineer New York.* Vol. 34.
 Kennelly, A. E. A Multiple Lightning Flash. P. 651.
 Thomson, Elihu. Multiple Flashes and Dark Flashes of Lightning. P. 738.
Ciel et Terre. Bruxelles. 20me Année.
 Arrhenius, S. Les oscillations séculaires de la température à la surface du globe terrestre. P. 389 and p. 411.
Scottish Geographical Magazine. Edinburgh. Vol. 15.
 — The Tianshan: [Its] Climate. P. 593.
Science. New York. Vol. 10.
 Wood, R. W. On the cause of Dark Lightning and the Clayden Effect. P. 717.
American Journal of Science. New Haven. 4 ser. Vol. 8.
 Fassig, O. L. Types of March Weather in the United States. P. 319.
Naturwissenschaftliche Rundschau. Braunschweig. 14 Jahr.
 Teisserenc de Bort. Ueber die Temperatur in der freie Atmosphäre und deren Aenderungen, nach den Beobachtungen von 90 Sonden Balloons. (Comptes Rendus, 1899.) P. 532.
Journal of Geology. Chicago. Vol. 7.
 Chamberlin, T. C. An attempt to frame a working Hypothesis of the cause of Glacial Periods on an Atmospheric Basis. P. 545.
 Tolman, C. F. Carbon Dioxide of the Ocean and its relation to the Carbon Dioxide of the Atmosphere. P. 585.
Sitzungsberichte der K. Preuss. Akademie der Wissenschaften. Berlin. 1899.
 Warburg, E. Ueber positive und negative Spitzenentladung in reinen Gasen. P. 770.
L'Aerophile. Paris. 7me année.
 Farman, M. De Paris au golfe de Fos en ballon. [Meteorological Observations, etc.] P. 111.
Zeitschrift für Luftschiffahrt und Physik der Atmosphäre. Berlin. 18 Jahr.
 Herring, A. M. Die Regulierung von Flugmaschinen. P. 206.
 Mertens. Ueber die Höhenkrankheit. P. 221.
 Tuma, J. Beiträge zur Kenntniss der atmosphärischen Elektrizität. P. 233.
Annalen der Physik und Chemie. Leipzig. N. f. Band 69.
 Wolff, W. Ueber die bei Explosionen in der Luft eingeleiteten Vorgänge. P. 329.
 Emden, R. Ueber den Luftwiderstand fliegender Geschosse. P. 454.
 Hirsch, R., v. Dichtbestimmungen von gesättigten Dämpfen und Flüssigkeiten. P. 456.
 Fomm, L. Elektrische Abbildungen. P. 479.
 Heydweiller, A. Bewegte Körper im elektrische Felde und über die elektrische Leitfähigkeit der atmosphärischen Luft. P. 531.
Nature. London. Vol. 60.
 Bidwell, Shelford. Dark Lightning Flashes. P. 591.
 — Meeting of the Meteorological Committee.
Meteorologische Zeitschrift. Wien. Band 18.
 Tabert, W. Die Bildung des Hagels. P. 433.
 Jensen, Chr. Beiträge zur Photometrie des Himmels. P. 447.
 Hann, J. Der tägliche Gang der Windgeschwindigkeit auf dem Wasserthurme und auf der Münster-Thurmspitze in Strassburg. P. 457.
 J. Hann. Klima von Salta, Argentinien. 466.
 J. Hann. Klima von Villa Maria. P. 468.
 J. Hann. Vorläufige Ergebnisse der meteorologischen Beobachtungen des belgischen antarktischen Expedition. P. 472 und 474.
 Wild, H. Ueber Normalthermometer. P. 462.
 Willaume-Jantzen, V. Klima des Faröer. P. 464.
 Buehrer, C., und Dufour, H. Aktinometer-Beobachtungen. P. 465.
 Koenig, H. Dauer des Sonnenscheins (in Stunden, Ortszeit) in Hamburg, 1898. P. 468.
 Buehler, Ebermayer, Hoppe, Muettrich. Untersuchungen über den Einfluss des Waldes auf den Stand des Gewässers. P. 469.
 MacDowell, Alex. B. Sonnenflecken-Periode und Frosttage in Frankreich. P. 473.
 Rocco. Die Temperatur bei Ätna-Observatorium. P. 473.
 — Zum Klima von Ostgrönland. P. 474.
 Schelle, E. Bemerkenswerthe Blitzformen. P. 475.
 Supan. Ueberschwemmung in der Sahara. P. 476.
 Moeller, M. Berichtigung. P. 476.
 Wolfer, A. Provisorische Sonnenflecken-Relativzahlen für das dritte Quartal, 1899. P. 476.

DESCRIPTION OF A NEW BRASS RIVER GAGE AT RICHMOND, VA., AND ITS METHOD OF SUPPORT.

By O. D. LEISENRING, Observer, U. S. Weather Bureau.

During a severe flood in February, 1899, when heavy ice moved out of the James River with exceptional violence and

gorged in constricted parts of the channel, the wooden river gage of the Weather Bureau at Richmond, Va., was seriously damaged and in due time the erection of a brass gage to replace it was authorized. Some peculiar features attach to the exposure of this gage, and they rendered the manner of its erection a subject for serious consideration. A method was finally devised which, although somewhat novel, was approved by the Chief of the Weather Bureau, and the work has been performed in accordance with it. In the hope that some suggestion valuable to others may be derived from it, this brief description of the plan is prepared.

Many small rocky islets dot the falls of the James River at Richmond, and a larger island, with a soil formation superposed, closes the group and extends into the tidewater below. The Richmond and Danville Railroad Company owns the land abutting on the mainland bank of the east channel, and has protected it with a retaining wall of granite masonry about 27 feet high. The old gage, located as nearly as possible at the foot of the falls, was attached in a vertical position to the face of this wall by iron holdfasts. Since the batter of the wall is nearly 3 feet, it follows that the gage stood off from the wall that distance at its top and proportional distances all the way down to zero. This construction gave rise to the danger of drift and floating ice wedging between the wall and the gage and damaging or destroying the latter. The danger was augmented by the constriction of the channel at this point, and by the increased rapidity of flow in times of high water. It was therefore considered that in erecting a new gage of material practically imperishable care ought to be taken to protect it from the possibility of destruction by violence. Two methods of accomplishing this result were at first considered: one by cutting a flaring recess in the face of the wall, having at its back a plumb surface of sufficient width for attaching the gage; and the other by making a shallow channel down the face of the wall, deep enough only to develop a plane surface throughout and to afford protection to the brass scale. Both of these methods were objectionable. The former as to cost, uncertainty about the thickness of the wall near its base, and the probable deposits of sediment and debris in the lower part of the recess; the latter because the gage would thus have an inclination with the face of the wall, and its readings would require a correction to be applied whenever they exceeded 3 feet or thereabout. The suggestion to attach a buttress of cement concrete to the wall, and to mount the gage on its plumb face, was finally considered and adopted.

This buttress has the shape of an inverted wedge of trapezoidal cross section. The thin end is recessed in the wall and is of sufficient thickness to be stable, and to hold the expansion bolts for fastening the gage. Thence it rises with its plumb face of uniform width (about 24 inches) to the height required, its inclined face resting on the wall and widening as it rises, and its sides forming up in the flaring triangular figures thus developed. It thus presents, at any stage of water, either a surface flush with the wall, or a projecting configuration well adapted to deflect or to resist the impact of any floating body. Probably few floating objects, save pack ice, will ever touch it, owing to the deflection of the carrying current by dead water before reaching the buttress.

The method of construction was as follows: The surface of the wall to be covered by the buttress was cleaned and all loose mortar and spalls scraped from the joints of the masonry. Holes were drilled for a row of anchor bolts spaced two feet vertically, and located alternately on each side of the gage seat. These bolts are of $\frac{1}{2}$ inch iron, and extend to 6 inches from the plumb face. Some extra anchors were inserted in convenient open joints of the masonry, and all were set in neat Portland cement. A mould was erected consisting of two heavy planks placed vertically, and securely